CLAIMS

1. A negative electrode for a nonaqueous secondary battery comprising a current collector and an active material structure containing an electro-conductive material having low capability of forming a lithium compound on at least one side of the current collector, the active material structure containing 5 to 80% by weight of active material particles containing a material having high capability of forming a lithium compound.

2. The negative electrode for a nonaqueous secondary battery according to claim 1, wherein the active material structure has an active material layer containing the active material particles and a surface coating layer located on the active material layer.

3. The negative electrode for a nonaqueous secondary battery according to claim 1, wherein the material having high capability of forming a lithium compound is tin or silicon.

4. The negative electrode for a nonaqueous secondary battery according to claim 2, wherein the active material layer contains 0.1 to 20% by weight of an electro-conductive carbon material.

5. The negative electrode for a nonaqueous secondary battery according to claim 2, wherein the material constituting the surface coating layer enters the active material layer or reaches the current collector.

6. The negative electrode for a nonaqueous secondary battery according to claim 2, wherein the material constituting the surface coating layer penetrates throughout the active material layer.

7. The negative electrode for a nonaqueous secondary battery according to claim 2, wherein the surface coating layer has a large number of micropores extending in the thickness direction of the surface coating layer and allowing a nonaqueous electrolyte to pass therethrough.

8. The negative electrode for a nonaqueous secondary battery according to claim 3, wherein the active material particles are particles of single silicon or single tin.

9. The negative electrode for a nonaqueous secondary battery according to claim 3, wherein the active material particles are mixed particles comprising at least silicon or tin and carbon, the mixed particles containing 10 to 90% by weight of silicon or tin and 10 to 90% by weight of carbon.

10. The negative electrode for a nonaqueous secondary battery according to claim 3, wherein the active material particles are mixed particles comprising silicon or tin and a metal, the mixed particles containing 30% to 99.9% by weight of silicon or tin and 0.1 to 70% by weight of at least one element selected from the group consisting of Cu, Ag, Li, Ni, Co, Fe, Cr, Zn, B, Al, Ge, Sn (except for a case where the active material particles contain tin), Si (except for a case where the active material particles contain silicon), In, V, Ti, Y, Zr, Nb, Ta, W, La, Ce, Pr, Pd, and Nd.

11. The negative electrode for a nonaqueous secondary battery according to claim 3, wherein the active material particles are silicon compound particles or tin compound particles, the silicon compound particles or the tin compound particles containing 30% to 99.9% by weight of silicon or tin and 0.1 to 70% by weight of at least one element selected from the group consisting of Cu, Ag, Li, Ni, Co, Fe, Cr, Zn, B, Al, Ge, Sn (except for a case where the active material particles contain tin), Si (except for a case where the active material particles contain silicon), In, V, Ti, Y, Zr, Nb, Ta, W, La, Ce, Pr, Pd, and Nd.

12. The negative electrode for a nonaqueous secondary battery according to claim 3, wherein the active material particles are mixed particles comprising silicon compound particles or tin compound particles and metal particles,

the mixed particles containing 30% to 99.9% by weight of silicon compound particles or tin compound particles and 0.1 to 70% by weight of particles of at least one element selected from the group consisting of Cu, Ag, Li, Ni, Co, Fe, Cr, Zn, B, Al, Ge, Sn (except for a case where the active material particles contain tin), Si (except for a case where the active material particles contain silicon), In, V, Ti, Y, Zr, Nb, Ta, W, La, Ce, Pr, Pd, and Nd, and

the compound particles containing 30% to 99.9% by weight of silicon or tin and 0.1 to 70% by weight of at least one element selected from the group consisting of Cu, Ag, Li, Ni, Co, Fe, Cr, Zn, B, Al, Ge, Sn (except for a case where the active material particles contain tin), Si (except for a case where the active material particles contain silicon), In, V, Ti, Y, Zr, Nb, Ta, W, La, Ce, Pr, Pd, and Nd.

13. The negative electrode for a nonaqueous secondary battery according to claim 3, wherein the active material particles are single silicon or single tin particles coated with a metal, the metal being at least one element selected from the group consisting of Cu, Ag, Ni, Co, Fe, Cr, Zn, B, Al, Ge, Sn (except for a case where the active material particles contain tin), Si (except for a case where the active material particles contain silicon), In, V, Ti, Y, Zr, Nb, Ta, W, La, Ce, Pr, Pd, and Nd, and the active material particles containing 30% to 99.9% by weight of silicon or tin and 0.1 to 70% by weight of the metal.

14. The negative electrode for a nonaqueous secondary battery according to claim 1, wherein the active material particles have a maximum particle size of 50 μm or smaller.

15. The negative electrode for a nonaqueous secondary battery according to claim 1, wherein the active material particles contain silicon and have an average particle size of 0.1 to 10 μm in terms of D_{50} and an oxygen concentration of less than 2.5% by weight, the outermost surface of the active material particles having a silicon concentration of higher than half of an oxygen concentration of the outermost surface.

16. The negative electrode for a nonaqueous secondary battery according to claim 2, wherein the surface coating layer contains at least one element selected from the group consisting of Cu, Ag, Ni, Co, Cr, Fe, and In.

17. The negative electrode for a nonaqueous secondary battery according to claim 2, wherein the surface coating layer is formed by electroplating.

18. The negative electrode for a nonaqueous secondary battery according to claim

2, wherein the surface coating layer is formed by sputtering, chemical vapor deposition or physical vapor deposition.

19. The negative electrode for a nonaqueous secondary battery according to claim 2, wherein the surface coating layer is formed by rolling an electro-conductive foil.

20. The negative electrode for a nonaqueous secondary battery according to claim 19, wherein the electro-conductive foil is a metal foil or an electro-conductive plastic foil.

21. The negative electrode for a nonaqueous secondary battery according to claim 2, wherein the active material layer is formed by applying a slurry containing the active material particles to a surface of the current collector.

22. The negative electrode for a nonaqueous secondary battery according to claim 2, wherein the surface coating layer has a thickness of 0.3 to 50 μm, and the active material layer has a thickness of 1 to 100 μm.

23. The negative electrode for a nonaqueous secondary battery according to claim 2, wherein the surface coating layer has a thickness of 0.3 to 50 μm, and the active material structure has a thickness of 2 to 100.

24. The negative electrode for a nonaqueous secondary battery according to claim 2, wherein the surface coating layer has a thickness of 0.3 to 50 μm, and the electrode has a total thickness of 2 to 200 μm.

25. The negative electrode for a nonaqueous secondary battery according to claim 1, wherein the current collector has a large number of micropores of 0.01 to 200 μm in diameter at a density of 5 to 10000 pores per cm^2 and has a thickness of 1 to 100 μm.

26. The negative electrode for a nonaqueous secondary battery according to claim 1, wherein the current collector is formed of punching metal or expanded metal, each having a large number of openings each having an opening area of 0.0001 to 4 mm^2 or

metal foam.

27. The negative electrode for a nonaqueous secondary battery according to claim 1, wherein the current collector is formed of electrolytic metal foil.

28. A process of producing the negative electrode for a nonaqueous secondary battery of claim 4, which comprises applying a slurry comprising the active material particles, the electro-conductive carbon material, a binder, and a diluting solvent to a surface of the current collector, drying the coating to form the active material layer, and electroplating the active material layer with the electro-conductive material having low capability of forming a lithium compound to form the surface coating layer.

29. A process of producing the negative electrode for a nonaqueous secondary battery of claim 4, which comprises applying a slurry comprising the active material particles, the electro-conductive carbon material, a binder, and a diluting solvent to a surface of the current collector, drying the coating to form the active material layer, and depositing the electro-conductive material having low capability of forming a lithium compound on the active material layer by sputtering, chemical vapor deposition or physical vapor deposition to form the surface coating layer.

30. A process of producing the negative electrode for a nonaqueous secondary battery of claim 25, which comprises forming a coat of a material different from the material making up the current collector on a carrier foil to a thickness of 0.001 to 1 μm, electroplating the carrier foil having the coat with the material making up the current collector to form the current collector, applying a slurry comprising the active material particles, the electro-conductive carbon material, a binder, and a diluting solvent to a surface of the current collector, drying the coating to form the active material layer, electroplating the active material layer with the electro-conductive material having low capability of forming a lithium compound to form the surface coating layer, and separating the current collector from the carrier foil.

31. A nonaqueous secondary battery having the negative electrode for a nonaqueous secondary battery according to claim 1.